



Base Floor Raiser for Liquid Containers

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Abstract— The Base Floor Raiser is a simple mechanical arrangement that is installed in liquid containers for the uninterrupted supply of liquid to the way maximum. These are mainly intended for using in liquid containers, used for tea or coffee supply. In traditional liquid containers there is a volume of space present below the outlet, which will interrupt the continuous flow of actual available liquid. One should slant the container, for obtaining the total available liquid. This makes it uncomfortable for the person using it. The chance of falling down of the liquid container is also not negligible, which may cause it defective. Also it is extremely hard to clean the base part of the liquid container. Continuous deposits of sediments will cause layer formation in the container, which eventually becomes the reason for occurrence of diseases. Here arise the need of a new and improved technology, which rectifies all the problem that are present in traditional design. So as a remedy for this we introduce the Base Floor Raiser which is a total solution for all this problems. The base is made movable and layers of spring are made installed beneath the base. It helps in the rise and fall of the base considering the weight which is applied on the top. This is sure to be highly successful commercial product, due to the regular and worldwide use of the liquid containers.

Index Terms— Base Floor, Liquid Container, Spring, Washer.

I. INTRODUCTION

In the day to day life we come across liquid containers, from which we drink tea or coffee. This Base Floor Raiser is mainly intended for using in liquid containers, used for tea or coffee supply.

In traditional liquid containers there is a volume of space present below the outlet, which will interrupt the continuous flow of available liquid. When we consider the traditional liquid container one should slant the container for obtaining the total available liquid. This makes it uncomfortable for the person using it. The chance of falling down of the liquid container is also not negligible, which may cause it defective.

Also it is extremely hard to clean the base part of the liquid container. Continuous deposits of sediments will cause layer

formation in the container, which eventually becomes the reason for the cause of several diseases. Sometimes serious problems like food poisonings will be caused due to this reason .

Here arise the need of a new and improved technology, which rectifies all the problem that are present in traditional design, because we cannot risk the life of people by practicing this type of unhygienic method all the time. It also ensures that complete cleaning of the container is made by rinsing it with water several times, which will eliminate the chance of sediment deposits on the walls and the edges of the container. So as a remedy for this we introduce the Base Floor Raiser which is a solution for all this problems. The base is movable and layers of spring are installed beneath the base. No liquid is allowed to occupy the cavity below the base floor, which is checked by the washer.

It helps in the rise and fall of the base considering the weight which is applied on the top. This is sure to be highly successful as a commercial product, due to the regular and worldwide use of the liquid containers. When the base floor is experiencing load, then it moves down increasing the volume of liquid accumulation. Gradually when the liquid is utilized, the load gets decreased which makes the base floor to rise. Complete discharge of liquid is made through this action.

The Base Floor Raiser is one such device which ensures the increased comfort rate and satisfies the necessities up to the maximum. By the introduction of the Base Floor Raiser it can be made sure that the complete amount of liquid is extracted from the container.

The needs and comforts of the people have to be continuously satisfied by using engineering as a tool for crafting the necessary devices. Human beings always try to remain in the idle position, by reducing the muscular work with more safety. So the engineers are always aiming for introducing device or systems that reduces the human labor and increase the comfort and safety of product.

This is sure to be a successful commercial product which will be used worldwide since the product cannot be neglected, due to the various applications made by it.



STUDY OF SUBJECT

WASHER

A washer is a thin plate with a hole in the middle, that is normally used to distribute the load of a threaded fastener, such as a screw or nut. Other uses are as a spacer, spring, wear pad, preload indicating device, locking device, and to reduce vibration like in rubber washer. Washers usually have an outer diameter about twice the width of their inner diameter.

Washers are usually metal or plastic. High quality bolted joints require hardened steel washers to prevent the loss of pre-load due to Brandling after the torque is applied. Rubber or fiber gaskets used in taps to stop the flow of water are sometimes referred to colloquially as washers; but, while they may look similar, washers and gaskets are usually designed for different functions and made differently. Washers are also important for preventing galvanic corrosion, particularly by insulating steel screws from aluminum surfaces.

Washers can be categorized into three types, according to their design and area of usage.

Plain washers, which spreads the load and prevent damage to the surface being fixed, or provide some sort of insulation such as electrical.

Spring washers which have axial flexibility and are used to prevent fastening loosening due to vibrations.

Locking washers, which prevent fastening loosening by preventing unscrewing rotation of the fastening device; locking washers are usually also spring washers.

The American National Standards Institute (ANSI) provides standards for general use flat washers. Type A is a series of steel washers with broad tolerances, where precision is NOT critical. Type B is a series of flat washers with tighter tolerances where outside diameters are categorized as 'Narrow', 'Regular' or 'Wide' for specific bolt sizes. The forms go from A to D for Bright Metal and denote outside diameter and thickness. They can be summarized as -

Form A: Normal diameter, normal thickness

Form B: Normal diameter, light thickness

Form C: Large diameter, normal thickness

Form D: Large diameter, light thickness

Forms E to G relate to black metal washers.

SPRINGS

Springs are elastic bodies (generally metal) that can be twisted, pulled, or stretched by some force. It could be also considered as an energy storing device. Which stores energy upon loading and release upon unloading. They can return to their original shape when the force is released. In other words it is also termed as a resilient member.

Based on the shape behavior obtained by some applied force, springs are classified into the following many ways.

The basic knowledge about springs is necessary to know about the actual system design of Base Floor Riser

Helical Springs are made of wire coiled in the form of helix. The cross section of a helical spring may be circular, square or rectangular. A helical spring is normally classified into two types namely the Open coil springs (or) Compression helical springs and closed coil springs (or) Tension helical springs

A helical tension spring has some means of transferring the load from the support to the body by means of some arrangement. It stretches apart to create load. It is notable that the gap between the successive coils is small.

The wire is coiled in a sequence that the turn is at right angles to the axis of the spring and spring is loaded along the axis. By applying load the spring elongates in action as it mainly depends upon the end hooks. The application of helical tension spring includes garage door assemblies, vise-grip pliers, and carburetors

In a helical compression springs the gap between the successive coils is larger. It is made of round wire and wrapped in cylindrical shape with a constant pitch between the coils. By applying the load the spring contracts and in unloading the spring comes back to its mean position. There are mainly four forms of compression springs which are namely, Plain end, plain and ground end, squared end, Squared and ground end. Among the four types, the plain end type is less expensive to manufacture. It tends to bow sideways when applying a compressive load. The application of helical compression springs includes Ball point pens, Pogo sticks and Valve assemblies in engines.

Torsion Spring is a form of helical spring, but it rotates about an axis to create load. It releases the load in an arc around the axis which creates torsion in the body. A torsion spring is mainly used for torque transmission in various devices. The ends of the spring are attached to other application objects, so that if the object rotates around the center of the spring, it tends to push the spring to retrieve its normal position. The applications of Torsion Springs include Mouse tracks, Rocker switches, Door hinges, Clipboards etc.

A Leaf spring is a simple form of spring commonly used in the suspension vehicles. A leaf spring is also called as a semi-elliptical spring; as it takes the form of a slender arc shaped length of spring steel of rectangular cross section. The center of the arc provides the location for the axle, while the tie holes are provided at either end for attaching to the vehicle body. Heavy vehicles, leaves are stacked one upon the other to ensure rigidity and strength. It provides dampness and springing function. It can be attached directly to the frame at the both ends or attached directly to one end, usually at the front, with the other end attached through a shackle, a short swinging arm.



PROPOSED METHODOLOGY

PRINCIPLE USED

The principle used in the Base Floor Raiser for Liquid Container is a very common and simple application of physics. With load, spring keeps compressed and without load the spring will relax itself. This makes the uninterrupted flow of liquid from the container.

BASE FLOOR RAISER FOR LIQUID CONTAINER

The Base Floor Raiser for Liquid Container is the mechanical arrangement which consist of an additional spring, a base floor and a washer which together contributes provides the uninterrupted flow of liquids. A washer is made installed around the base floor in this new arrangement.

PARTS OF BASE FLOOR RAISER FOR LIQUID CONTAINER

The two major parts which allows the un-interrupted flow of liquid in a “Base Floor Raiser for Liquid Container” are:

1. Springs
2. Base Floor

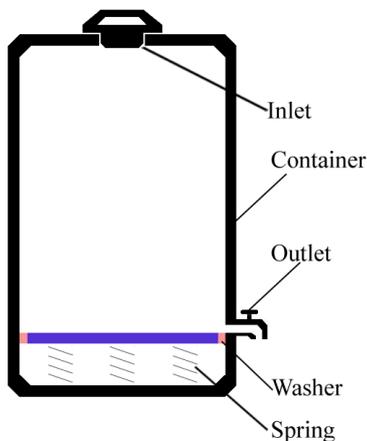


FIG-01

Spring

Spring is the primary part of the “Base Floor Raiser for Liquid Container” which compresses when liquid is loaded initially and relaxing when un-loaded. Multiple springs are arranged in the bottom of the base floor in this type of arrangement.

Base Floor

A Base Floor is introduced just above the container’s initial base. This allows the rise and fall of the base according to the needs.

The sediments in liquids are allowed to settle down initially and clear liquid without the presence of sediments are being introduced at the inlet. The liquid accumulation area and the cavity beneath are separated by this layer.

STAGES OF BASE FLOOR RAISER

Mainly there exist three stages of operation for a base floor raiser arrangement.

- Stage 01 : The Container at Un-Loaded Condition.
- Stage 02 : The Container at Maximal Load.
- Stage 03 : Raising of Base Floor

Stage 01 : The Container at Un-Loaded Condition.

Initially the container is at unloaded condition, which means that no liquid is introduced in the container. At this stage we can observe that the spring is seen maximum relaxed.

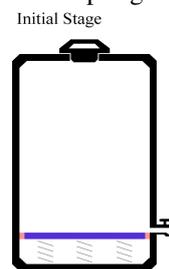


FIG-02

Stage 02 : The Container at Maximal Load.

When the container is filled with the maximal liquid that can be occupied we could notice that the spring at the bottom gets compressed to maximal possible. The base floor moves down and allows the sediments in the liquid to get settle down at the bottom of the container.

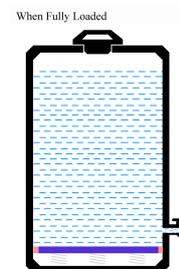


FIG-03

Stage 03 : Raising of Base Floor

At this stage it is note able that the base floor moves upward as the weight in the container decreases according to the outlet dispassion made. The gradual raise in the base floor allows the uninterrupted flow of the liquid possible through this system



FIG-04

Thus we get the un-interrupted liquid supply as we need by using the base floor raiser for liquid containers.



CONCLUSION

The Base Floor Raiser is a simple mechanical arrangement that is installed in liquid containers for the uninterrupted supply of liquid to the way maximum. This is an arrangement which is made to increase the comfort of people who uses the liquid containers.

REFERENCES

- [1] White, Lynn Jr. (1966). *Medieval Technology and Social Change*. New York: Oxford Univ. Press. ISBN 0-19-500266-0., p.126-127
- [2] Usher, Abbot Payson (1988). *A History of Mechanical Inventions*. Courier Dover. ISBN 0-486-25593-X., p.305

- [3] Dohrn-van Rossum, Gerhard (1997). *History of the Hour: Clocks and Modern Temporal Orders*. Univ. of Chicago Press. ISBN 0-226-15510-2., p.121

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